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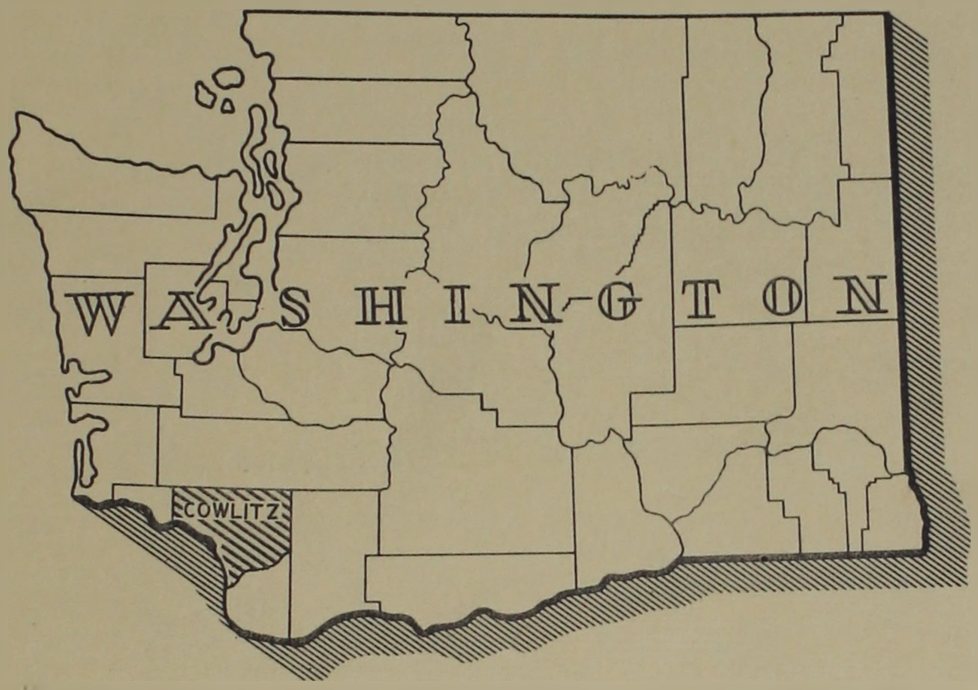
FOREST STATISTICS FOR COWLITZ COUNTY, WASHINGTON

FOREST SURVEY REPORT NO. 105



U. S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
R. W. COWLIN, DIRECTOR

PORTLAND, OREGON

AUGUST 1952

PREPARED BY THE DIVISION OF FOREST ECONOMICS

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FOREST STATISTICS

FOR

COWLITZ COUNTY, WASHINGTON

Forest Survey Report No. 105

by

F. L. Moravets

U. S. Department of Agriculture Forest Service
Pacific Northwest Forest and Range Experiment Station

R. W. Cowlin, Director
August 1952

FOREWORD

This publication summarizes in statistical form the results of a reinventory of the forests of Cowlitz County, Washington, conducted in 1949. This reinventory is a part of the maintenance phase of the Forest Survey, a Nation-wide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928 and amended June 25, 1949. The sixfold purpose of the project is: (1) To make an inventory of the extent and condition of forest lands and of the present supply of timber and other forest products on these lands; (2) to ascertain the rate at which this supply is being increased through growth, and the potential growth on forest areas; (3) to determine the extent of depletion of the forests through cutting and through loss from fire, insects, disease, windthrow, and other causes; (4) to determine the present consumption and probable future trend in requirements for timber and other forest products; (5) to analyze and correlate these findings with other economic data, as an aid in the formulation of private and public policies for most effective and rational use of land suitable for forest production, and (6) to make such resurveys as are necessary to keep the basic information up to date.

The Forest Survey is conducted in the various forest regions of the Nation by the regional forest experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oregon.

Under the initial phase of the Forest Survey Cowlitz County was inventoried during 1930 and 1931. Later the inventory was adjusted to September 1933 and a statistical report, "Forest Statistics for Cowlitz County, Washington" and a detailed forest type map--scale 1 inch to the mile--were released. In 1939 the first reinventory of the county was made and a revised statistical report and forest type map prepared.

Following the second reinventory, in 1949, the forest type map has again been revised. 1/

1/ A print of the forest type map is available at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, 423 U. S. Court House, Portland 5, Oregon.

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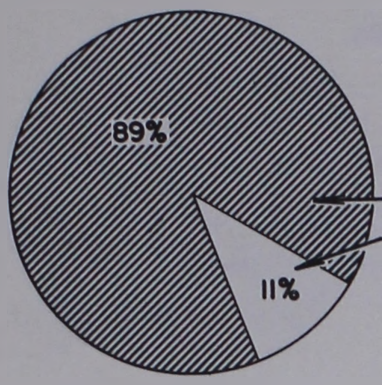
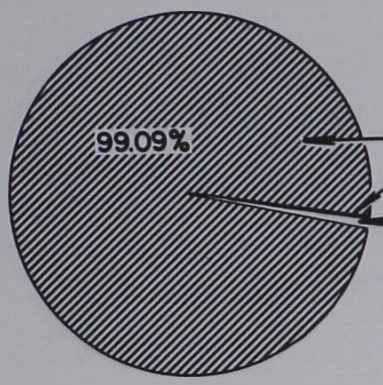
SIGNIFICANT SURVEY FINDINGS

LAND-USE CLASSES



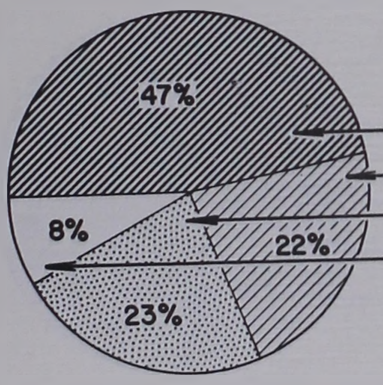
CLASS	THOUSAND ACRES
FOREST LAND	657
NONFOREST LAND	78
TOTAL	735

FOREST-LAND CLASSES



CLASS	THOUSAND ACRES
COMMERCIAL FOREST	651
RESERVED COMMERCIAL FOREST	1
NONCOMMERCIAL FOREST	5
TOTAL	657

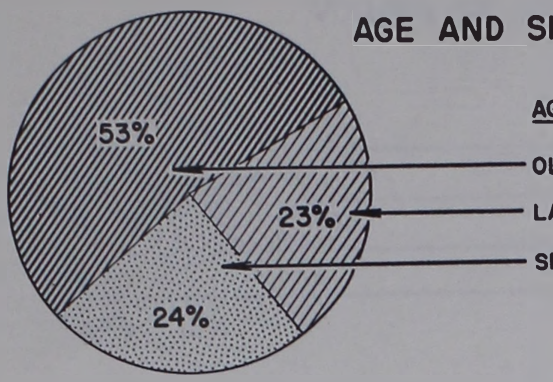
STAND-SIZE CLASSES*



CLASS	THOUSAND ACRES
SAW TIMBER	307
POLE TIMBER	144
SEEDLINGS AND SAPLINGS	146
NONSTOCKED	54
TOTAL	651

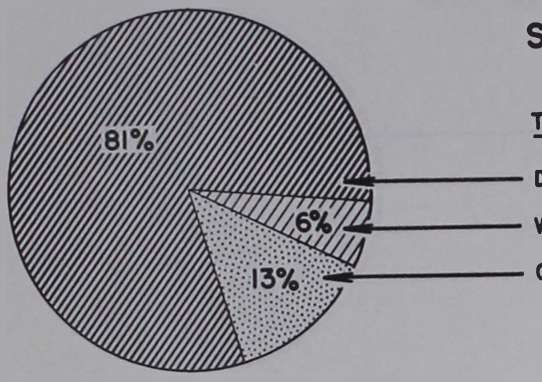
* ON COMMERCIAL FOREST LAND

AGE AND SIZE OF SAW-TIMBER STANDS*



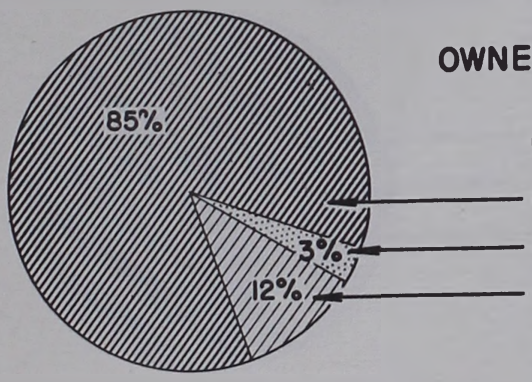
AGE AND SIZE	THOUSAND ACRES
OLD GROWTH	164
LARGE YOUNG GROWTH	69
SMALL YOUNG GROWTH	74
TOTAL	307

SAW-TIMBER TYPES*



TYPE	THOUSAND ACRES
DOUGLAS-FIR	249
WESTERN HEMLOCK	19
OTHER	39
TOTAL	307

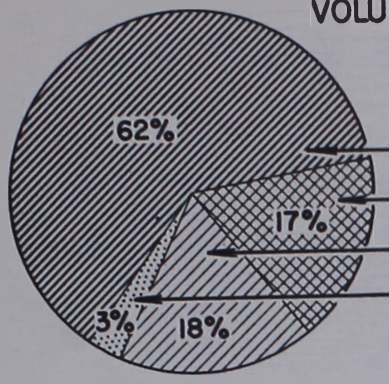
OWNERSHIP OF FOREST LAND*



OWNERSHIP	THOUSAND ACRES
PRIVATE	550
FEDERAL	21
OTHER PUBLIC	80
TOTAL	651

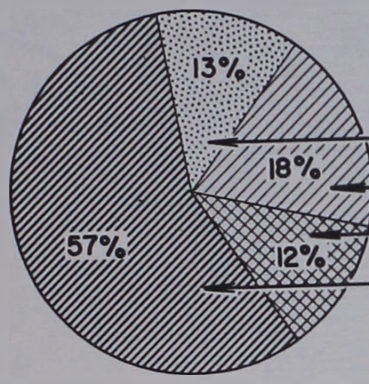
* ON COMMERCIAL FOREST LAND

VOLUME OF LIVE SAW-TIMBER BY SPECIES*



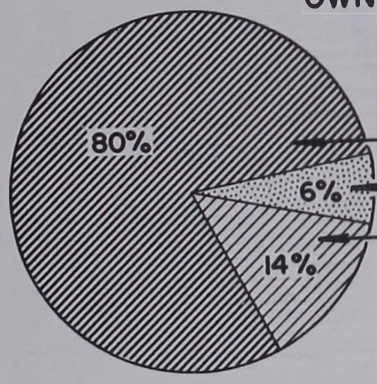
SPECIES GROUP	MILLION BD. FT. SCRIBNER RULE
DOUGLAS-FIR	12,865
WESTERN HEMLOCK	3,503
OTHER CONIFERS	3,887
HARDWOODS	603
TOTAL	20,858

SIZE OF DOUGLAS-FIR TIMBER*



DIAMETER CLASS	MILLION BD. FT. SCRIBNER RULE
11.0"-20.9" D.B.H.	1,724
21.0"-30.9" D.B.H.	2,257
31.0"-40.9" D.B.H.	1,515
41.0" AND LARGER	7,369
TOTAL	12,865

OWNERSHIP OF LIVE SAW-TIMBER VOLUME*



OWNERSHIP	MILLION BD. FT. SCRIBNER RULE
PRIVATE	16,660
FEDERAL	1,212
OTHER PUBLIC	2,986
TOTAL	20,858

* ON COMMERCIAL FOREST LAND

FIGURE I

OUTLINE MAP OF COWLITZ COUNTY, WASHINGTON

1952

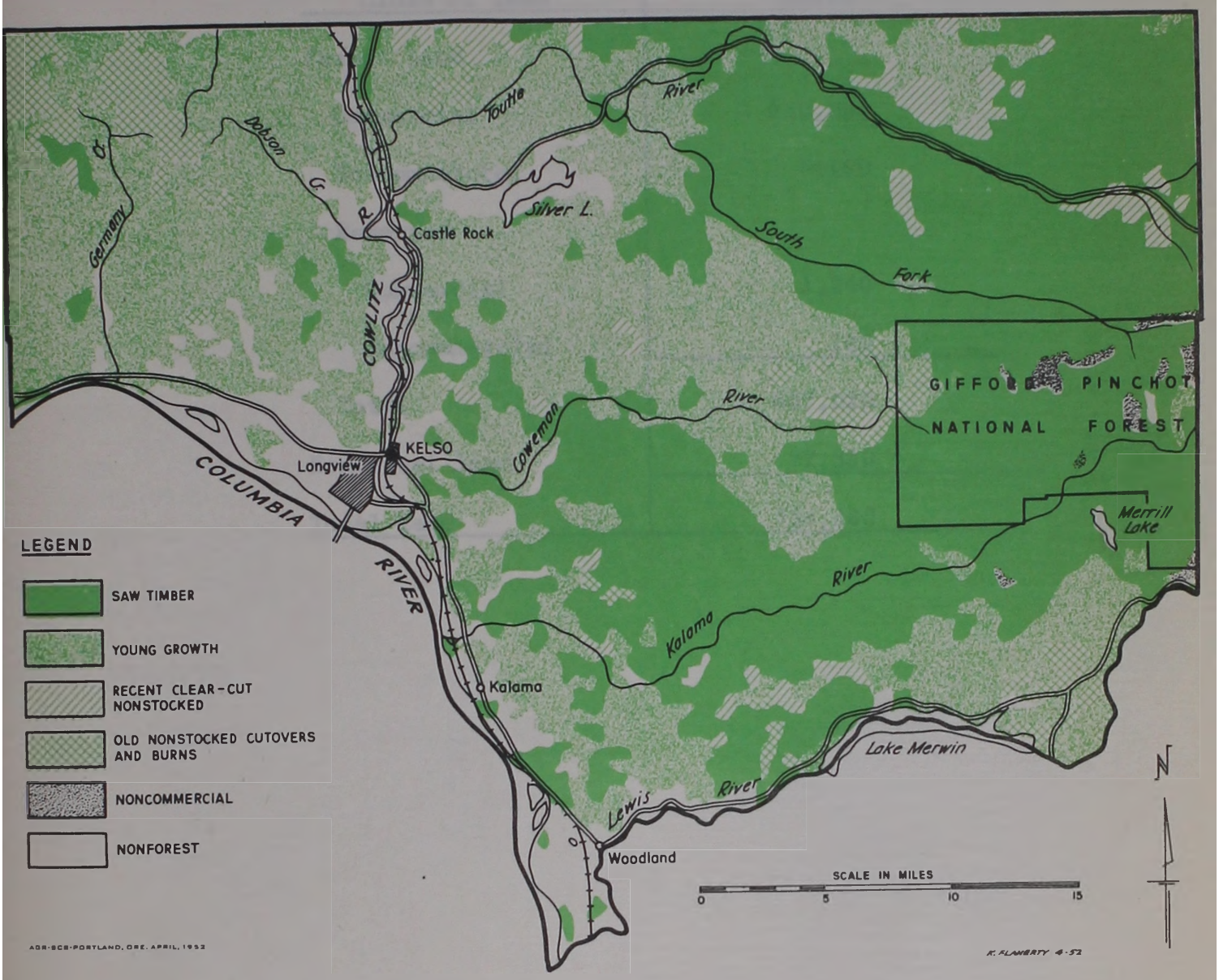


Table 1.--Land area by major classes of forest land, 1949

Class of land	Acres
Forest land	
Commercial	650,000
Noncommercial	5,160
Reserved	
Commercial	1,240
Noncommercial	120
Total	657,020
Nonforest land	77,860
Total land	734,880

Table 2.—Commercial forest land area by ownership class by stand-size class, 1949

Ownership class	Total	Saw-timber stands	Pole-timber stands	Seedling and sapling stands	Non-stocked areas
	Acres	Acres	Acres	Acres	Acres
Federally owned or managed					
National forest	16,790	16,360	340	90	—
Public domain	3,870	1,850	850	610	560
Total Federal	20,660	18,210	1,190	700	560
State	76,360	43,750	8,800	14,500	9,310
County	3,640	650	1,670	960	360
Private	549,840	244,380	132,740	129,390	43,330
Total all ownerships	650,500	306,990	144,400	145,550	53,560

Table 3.--Commercial forest land area by forest type by stand-size class, 1949

Forest type	Total	Saw-timber stands			Pole-timber stands	Seedling and sapling stands	Non-stocked areas
		Old growth	Large young growth	Small young growth			
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Douglas-fir	508,710	113,000	69,320	66,980	130,870	128,540	
Western hemlock	23,220	18,440		630	1,120	3,030	
Sitka spruce	240	240					
Western redcedar	3,150	230			80	2,840	
True fir-mountain hemlock	31,450	30,500		820	60	70	
White pines	1,250	640		480	130		
Lodgepole pine	890			40	670	180	
Hardwoods	28,030	1,090		4,580	11,470	10,890	
Nonstocked areas	53,560						53,560
Total	650,500	164,140	69,320	73,530	144,400	145,550	53,560

Table 4.--Area of commercial and noncommercial forest land and nonforest land by cover type and ownership class, 1949

(Acres)

Survey type symbol	Cover type	Total	Unreserved						Reserved		
			Total	Private	State	County	Federal: Public domain	Federal: National forest	Total	State	Municipal
All lands											
	Forest land	557,020	555,660	552,620	76,490	3,640	3,870	19,040	1,360	1,120	240
	Nonforest land	77,860	77,830	76,270	1,250	40		270	30	30	
	Total	734,880	733,490	628,890	77,740	3,680	3,870	19,310	1,390	1,150	240
Commercial forest land											
D5	Douglas-fir, large old-growth saw timber (yellow fir)	113,970	113,000	87,530	20,650			4,820	970	970	
D4	Douglas-fir, small old-growth and large young-growth saw timber (red fir)	69,320	69,320	58,240	9,030	490	470	1,090			
D3	Douglas-fir, small young-growth saw timber	67,090	66,980	58,320	7,040	160	1,300	160	110	110	
D2	Douglas-fir, pole timber	130,910	130,870	120,810	8,190	990	850	30	40	40	
D1	Douglas-fir, seedlings and saplings	128,540	128,540	113,670	13,500	800	570				
H4	Western hemlock large saw timber	18,440	18,440	13,620	2,560			2,260			
H3	Western hemlock small saw timber	630	630	430	40		40	120			
H2	Western hemlock pole timber	1,120	1,120	1,040	40	40					
H1	Western hemlock seedlings and saplings	3,030	3,030	2,070	960						
S4	Sitka spruce large saw timber	240	240	240							
C4	Western redcedar large saw timber	230	230	150	80						
C2	Western redcedar pole timber	80	80	80							
C1	Western redcedar seedlings and saplings	2,840	2,840	2,840							
FM4	True fir-mountain hemlock large saw timber	30,500	30,500	19,320	4,180		40	6,960			
FM3	True fir-mountain hemlock small saw timber	820	820	570	80			170			
FM2	True fir-mountain hemlock pole timber	60	60	60							
FM1	True fir-mountain hemlock seedlings and saplings	70	70	70							
W4	White pine large saw timber	640	640	200				440			
W3	White pine small saw timber	480	480	200				280			
W2	White pine pole timber	130	130	90				40			
LP3	Lodgepole pine small saw timber	40	40	40							
LP2	Lodgepole pine pole timber	790	670	390	10			270	120		120
LP1	Lodgepole pine seedlings and saplings	180	180	90				90			
HD4	Hardwood large saw timber	1,090	1,090	1,050				40			
HD3	Hardwood small saw timber	4,580	4,580	4,470	90			20			
HD2	Hardwood pole timber	11,470	11,470	10,270	560	640					
HD1	Hardwood seedlings and saplings	10,890	10,890	10,650	40	160	40				
X	Recent clear-cut area nonstocked	22,660	22,660	17,290	5,370						
XO	Old clear-cut area nonstocked	23,410	23,410	21,050	2,320	40					
F	Area deforested by fire	7,490	7,490	4,990	1,620	320	560				
	Total	651,740	650,500	549,840	76,360	3,640	3,870	16,790	1,240	1,120	120
Noncommercial forest land											
SA	Subalpine	1,010	890	210	80			600	120		120
NR	Noncommercial rocky	4,270	4,270	2,570	50			1,650			
	Total	5,280	5,160	2,780	130			2,250	120		120
Nonforest land											
O	Open--nonvegetative	15,990	15,990	15,180	790			20			
G	Grass and brush	5,010	4,980	4,700	30			250	30	30	
A	Agricultural	56,860	56,860	56,390	430	40					
	Total	77,860	77,830	76,270	1,250	40		270	30	30	

Table 5.--Area of commercial forest land by generalized forest type and ownership class, 1949

(Acres)

Generalized forest type		Total	Unreserved						Reserved		
			Total	Private	State	County	Federal: Public domain	Federal: National forest	Total	State	Municipal
Conifer saw timber Types D3, D4, D5, H3, H4, S4, C4, FM3, FM4, W3, W4, and LP 3	Virgin	300,540	299,460	237,080	43,580	650	1,850	16,300	1,080	1,080	
	Selectively cut	1,860	1,860	1,780	80						
	Total	302,400	301,320	238,860	43,660	650	1,850	16,300	1,080	1,080	
Conifer pole timber Types D2, H2, C2, FM2, W2, and LP2	On cutovers	106,890	106,850	101,380	4,790	680			40	40	
	On burns	26,200	26,080	21,090	3,450	350	850	340	120		120
	Total	133,090	132,930	122,470	8,240	1,030	850	340	160	40	120
Conifer seedlings and saplings Types D1, H1, C1, FM1, and LP1	On cutovers	115,660	115,660	103,320	11,500	760	80				
	On burns	8,970	8,970	5,790	2,560	40	490	90			
	On plantations	10,030	10,030	9,630	400						
	Total	134,660	134,660	118,740	14,460	800	570	90			
Recent clear-cut areas, nonstocked Type X		22,660	22,660	17,290	5,370						
Nonstocked clear-cut and burned-over areas Types XO and F		30,900	30,900	26,040	3,940	360	560				
Hardwoods Types HD1, HD2, HD3, and HD4		28,030	28,030	26,440	690	800	40	60			
Total		651,740	650,500	549,840	76,360	3,640	3,870	16,790	1,240	1,120	120

Table 6.—Volume of live saw timber and primary growing stock on commercial forest land by ownership class, 1949

Ownership class	Live saw timber		Primary growing stock
	Million bd.ft. log scale, Scribner rule	Million bd.ft. International ¼-inch rule	Million cubic feet
Federally owned			
National forest	1,086	1,164	181
Public domain	126	135	22
Total Federal	1,212	1,299	203
State	2,938	3,149	500
County	48	51	10
Private	16,660	17,855	2,932
Total all ownerships	20,858	22,354	3,645

Table 7.—Volume of live saw timber and primary growing stock on commercial forest land by stand-size class, 1949

Stand-size class	Live saw timber		Primary growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Saw-timber stands	20,355	21,791	3,383
Pole-timber stands	369	417	218
Seedling and sapling stands	113	123	38
Nonstocked areas	21	23	6
Total all stands	20,858	22,354	3,645

Table 8.—Volume of live saw timber and primary growing stock on commercial forest land by species, 1949

Species	Live saw timber		Primary growing stock
	Million board feet log scale, Scribner rule	Million board feet International ¼-inch rule	Million cubic feet
Softwoods:			
Douglas-fir	12,865	13,708	2,122
Western white pine	53	57	14
Western hemlock	3,503	3,783	678
Mountain hemlock	1	1	2/
Western redcedar	1,349	1,430	201
Sitka spruce	2	2	2/
Engelmann spruce	1/	1/	2/
Pacific silver fir	1,672	1,806	339
Grand fir	6	6	2
Noble fir	804	868	118
Total softwoods	20,255	21,661	3,474
Hardwoods:			
Red alder	428	492	139
Bigleaf maple	148	170	26
Black cottonwood	25	29	5
Oregon ash	2	2	1
Total hardwoods	603	693	171
Total all species	20,858	22,354	3,645

1/ Less than 500 thousand board feet.

2/ Less than 500 thousand cubic feet.

Table 9.--Volume of live Douglas-fir and western white pine saw timber on commercial forest land by diameter-class group, 1949

Diameter class	Total	Douglas-fir	Western white pine
11.0" to 20.9" d.b.h.			
Million bd.ft. log scale, Scribner rule	1,732	1,724	8
Million bd.ft. International $\frac{1}{4}$-inch rule	2,009	2,000	9
21.0" to 30.9" d.b.h.			
Million bd.ft. log scale, Scribner rule	2,266	2,257	9
Million bd.ft. International $\frac{1}{4}$-inch rule	2,448	2,438	10
31.0" to 40.9" d.b.h.			
Million bd.ft. log scale, Scribner rule	1,551	1,515	36
Million bd.ft. International $\frac{1}{4}$-inch rule	1,644	1,606	38
41.0" d.b.h. and larger			
Million bd.ft. log scale, Scribner rule	7,369	7,369	
Million bd.ft. International $\frac{1}{4}$-inch rule	7,664	7,664	
All diameter classes			
Million bd.ft. log scale, Scribner rule	12,918	12,865	53
Million bd.ft. International $\frac{1}{4}$-inch rule	13,765	13,708	57

Table 10.--All-timber volume on commercial forest land by kind of material, 1949

Kind of material	Volume
	Million cubic feet
Live all timber	
Primary growing stock	3,645
Secondary growing stock	44
Total	3,689
Salvable dead all timber	182
Total all timber	3,871

Table 11.--Commodity drain of live saw-timber volume and primary growing stock on commercial forest land, by species group, 1948

Species group	Live saw-timber volume						Primary growing stock		
	Cutting drain	Logging waste	Commodity drain 1/	Cutting drain	Logging waste	Commodity drain 1/	Cutting drain	Logging waste	Commodity drain 1/
	Thousand board feet, log scale, Scribner rule			Thousand board feet, International $\frac{1}{4}$-inch rule			Thousand cubic feet		
Softwoods	222,699	31,846	254,545	238,288	34,075	272,363	43,739	5,336	49,075
Hardwoods	2,888	413	3,301	3,176	454	3,630	600	50	650
Total	225,587	32,259	257,846	241,464	34,529	275,993	44,339	5,386	49,725

1/ Total of cutting drain and logging waste.

FOREST SURVEY PROCEDURE

The procedure used in the second Forest Survey reinventory of Cowlitz County was materially different from the procedures used in the initial inventory and first reinventory. This change in procedure accounts for some significant differences in both the forest-area and timber-volume statistics obtained. Therefore, a brief description of each of the procedures appears desirable.

Initial Inventory

The initial inventory of the county was conducted in 1930 and 1931 by what was known as the "compilation method." In this method existing information on forest types, timber cruises and other pertinent data was collected from private timber owners and various public agencies. These data were checked in the field for reliability, and were then adjusted to the specifications and standards of Forest Survey. Forest-type and timber-volume data for areas not covered by existing information were obtained through field reconnaissance.

All land in the county was classified as either forest or non-forest. Forest land was further classified as commercial or non-commercial; the commercial forest land by type, stand-size class, and in case of young-growth stands by stocking and age classes. These types and classes were delineated on 1-inch-to-the-mile base maps of each township. These township type maps were then superimposed over ownership-status plats and dot counted to obtain forest-type-area statistics by ownership class. Type delineations on the township maps were traced on a base map of the county to form a county forest type map.

In-place, timber-volume estimates were based on the existing cruise data collected from private and public sources, on field cruises, and on ocular estimates. Volume of young-growth saw timber was computed by applying yield-table values, adjusted for age of stand, stocking density, and site, to type acreages.

First Reinventory

The first reinventory consisted of the complete revision of the forest type map of the county and of the adjustment of the original inventory statistics on forest area and timber volume to take care of changes due to forest drain and forest growth that had occurred in the interval between inventories. Forest

area changes due to cutting and other forms of drain were obtained from records from various sources, then checked in the field by ground reconnaissance and mapped in place. Changes by stand-size class due to restocking of cut-over and burned-over land, and ingrowth and outgrowth of stands between stand classes were also noted in the field and mapped in place.

On basis of the revised forest type map and revision of the ownership status, new forest-area and timber-volume statistics were recomputed.

Second Reinventory

In the second reinventory complete revision of the forest type map was obtained through interpretation, classification, and mapping on aerial photos covering nearly all of the land area; the small area for which photos were not available was covered by ground reconnaissance. In the mapping on aerial photos, types whose classifications were in doubt and species composition of stands were checked in the field. The use of aerial photos in mapping resulted in type delineations of much greater accuracy and detail than were possible through the ground reconnaissance employed in the initial inventory and first reinventory. In the preparation of a revised type map, the delineations on the aerial photos were transferred to a 1-inch county base map through use of a photo projector. The new type map was then superimposed over a current ownership-status map of complete county coverage and a dot count made of forest type areas by ownership class.

Volume estimates each of live saw timber, primary growing stock, and salvable dead material were calculated by applying average per-acre volumes to the appropriate forest type acreages. The average per-acre volumes for saw-timber stands and pole-timber stands were obtained through a sampling procedure in which the stands were measured on randomly selected plots. Intensity of the sampling was so designed as to produce a total estimate of volume in the county of a specified sampling accuracy set by Forest Survey. In the random selection of samples each individual saw-timber or pole-timber stand in the county had an equal chance of being selected. A sample consisted of a cluster of 3 one-fifth-acre circular plots spaced at regular 6-chain intervals. A total of 126 plot clusters, or 378 one-fifth-acre plots was taken in saw-timber and pole-timber stands.

Average per-acre volumes for seedling and sapling stands and non-stocked areas were obtained through an aerial-photo-plot sampling procedure. A total of 1,070 one-acre photo plots was taken in a modified systematic-random pattern. By photo interpretation, estimates were made of average number of trees per acre of both saw-timber and pole-timber

size, average crown diameter, and total tree height; volume of the average tree was obtained from photo-volume tables.

ACCURACY OF DATA

Forest Area

In the reinventory of the county, in-place mapping of the forests and their classification by forest type, stand-size class, or condition class were on the basis of 100-percent coverage. Thus no sampling error was involved. Errors due to techniques or judgment in the field and in office computation of data were possible, but difficult to evaluate. Throughout all phases of the work close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

Availability of aerial-photo coverage for nearly all of the forest land in the county facilitated the mapping and classification. Preparation of a county forest type map, through projection of the detail delineations from aerial photos, was materially aided by complete coverage of fairly recent U. S. Geological Survey base map quadrangles. Accuracy of the type map was contingent on the accuracy of the base map.

Timber Volume

Estimates of timber volume obtained through the random sampling procedure employed may be subject to two types of error: (1) errors in technique, tree measurements, plot-area measurements, judgment in cull and breakage allowances, volume tables used, and computation of data, and (2) sampling error. Errors of the type listed under (1) are either impossible or difficult to evaluate. However, in the survey every effort was made to minimize the effect of such errors through training, supervision, and checking. The sampling error can be calculated through statistical analysis of the sample-plot volume data.

Analysis of the volume data indicates that the sampling error, in terms of one standard error, of the total board-foot volume of live saw timber was ± 5.26 percent. In other words, the probabilities are two out of three that the actual volume if measured by a 100-percent tree cruise would have been within ± 5.26 percent of the estimated volume. Expressed in board feet, the sampling error was ± 1,097 million board feet, log scale, Scribner rule (5.26 percent of the total volume of 20,858 million board feet). The sampling error of the estimated total volume of primary growing stock was calculated to be ± 4.18 percent, or ± 152 million cubic feet (4.18 percent of 3,645 million cubic feet).

The volume estimates by species, stand-size class, or ownership class are not as accurate as that of total volume in the county. Size of sampling error depends on volume involved--the smaller the volume the greater the sampling error.

COMPARISON OF INVENTORIES

It is possible to make a direct comparison of certain of the statistical information from the second reinventory, in 1949, with that from the initial inventory, in 1933, and the first reinventory in 1939. In the case of some statistics, however, a direct comparison is not feasible due to a difference between inventories in Forest Survey specifications and standards of utilization.

Forest Land

Statistics on forest-land areas obtained in the three inventories are shown in tabular form below on a comparable basis. The forest land is segregated into commercial and noncommercial forest land; the commercial forest land is segregated by stand-size class.

Changes in Forest Land by Stand-Size Class, Between Inventories

Inventory	Total forest land	Commercial forest land (unreserved and reserved)					Noncommercial forest land
		Total	Sawtimber	Pole timber	Seedlings and saplings	Nonstocked areas	
	Thousands of acres						
1933	637	635	368	79	52	136	2
1939	663	662	330	108	97	127	1
1949	657	652	308	145	146	53	5

The differences in total area of forest land between inventories--a 4-percent increase between 1933 and 1939, and a 1-percent decrease between 1939 and 1949--are not due to any appreciable extent to physical change. Rather they can be attributed very largely to a difference in interpretation in classification and also in mapping procedures employed. The use of aerial photos in 1949 resulted in much greater detail and accuracy in mapping forest land versus nonforest land than was possible by ground surveys in 1933 and 1939. Only a relatively small acreage of forest land has been converted to agricultural use in the last two decades.

Differences in the total areas of commercial forest land are closely in line with those in total forest land, except that in 1949 a greater acreage of stands on the higher slopes and ridges of the northeastern portion of the county were classed as subalpine timber, noncommercial in character.

The trends in the areas of the four stand-size classes--saw timber, pole timber, seedlings and saplings, and nonstocked--reflect the changes during the 16-year interval due to the cutting of saw-timber stands, restocking of cut-over land, and ingrowth and outgrowth of pole-timber and seedling and sapling stands. For example, on the basis of recorded volume of timber cut during the interval probably from 85,000 to 90,000 acres of saw-timber stands were clearcut; ingrowth from pole-timber stands has reduced this area to a net change of 60,000 acres. In the case of pole-timber stands the outgrowth of some 25,000 to 30,000 acres was greatly exceeded by the area of ingrowth from seedling and sapling stands; the net increase amounted to 66,000 acres.

Study of the respective acreages of seedling and sapling stands and of nonstocked areas in the three inventories reveals a favorable trend in the restocking of cut-over and burned-over land. The large increase between 1933 and 1949 in acreage of seedling and sapling stands matches quite closely the large decrease during the interval in acreage of nonstocked areas. In analyzing the trend in acreage of seedling and sapling stands one must, of course, consider the outgrowth of these stands to the next higher stand-size class--pole timber.

Analysis of the three acreages of nonstocked areas clearly indicates the extent of restocking. The following table gives a break-down of the three acreages:

Character of nonstocked areas	Acreage in inventory of--		
	1933	1939	1949
	Thousands of acres		
Recent cut-over areas 1/ (Cut 1920-33	79		
(Cut 1930-39		66	
(Cut 1945-49			23
Old cut-over areas (Cut prior to 1920	33		
(Cut prior to 1930		38	
(Cut prior to 1945			23
Nonstocked burned-over areas	24	23	7
Total	136	127	53

1/ In the 1933 and 1939 inventories "recent cut-over areas" included all areas clear-cut during the stated period regardless of whether or not they had restocked by the inventory date. It is estimated that about 50 percent of the 1933 and 1939 acreages of recent cut-over areas were restocked by the inventory date. In the 1949 inventory "recent cut-over areas" included only clear-cut areas that had not restocked by the inventory date; restocked areas were classified as seedling and sapling stands.

Timber Volume

Timber volumes obtained in the 1949 inventory cannot be directly compared with the volumes obtained in the 1933 and 1939 inventories. A lowering of the minimum diameter, breast height, of live saw timber from 15.0 inches, used in 1933 and 1939, to 11.0 inches in 1949 is one reason. Another reason is the significant extent to which there has been an intensification of woods utilization in the 16-year interval between inventories. In recent years loggers have taken a greater portion of the stand volume out of the woods in the form of forest products. This closer utilization was accounted for in the 1949 inventory by using volume tables that gave values from 10 to 20 percent higher for a tree of given size than did the volume tables used in the two earlier inventories.

The following table shows the respective volumes each of live saw timber and primary growing stock. The 1949 live saw-timber volume has been adjusted to include only the volume in trees 15.0 inches d.b.h. and larger--the same minimum specification as used in the other two inventories.

Changes in Timber Volume Between Inventories

Inventory	Volume on commercial forest land (unreserved and reserved) of—	
	Live saw timber	Primary growing stock
	Million board feet, log scale, Scribner rule	Million cubic feet
1933	18,582	4,491
1939	15,892	3,876
1949	20,127	3,657

The 8-percent increase in board-foot volume of live saw timber from 1933 to 1949 reflects the closer utilization of timber mentioned above. Also involved is the volume of young-growth trees that grew into the saw-timber class during the 16 years. A third factor is the inclusion in 1949 of the volume in scattered saw-timber trees in the overstory of seedling and sapling stands, and on cut-over or burned-over areas classified as nonstocked. The volume of such trees was not included in 1933 or 1939.

There was a 19-percent decrease in the volume of primary growing stock during the 16 years. This is a more realistic trend than that of saw-timber volume. There were no differences in specifications and standards of utilization involved in the three inventories of primary growing stock.

DEFINITION OF TERMS USED

Land Area

Total Land.

Includes dry land and unmeandered water surface.

Forest Land.

Includes (a) land which is at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10 percent stocking and which has not been developed for other use. Minimum area of forest land recognized in reinventory of the Unit was 40 acres.

Nonforest Land.

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the Unit was 40 acres.

Forest Land Classes

Commercial Forest Land.

Forest land which is producing, or is physically capable of producing, usable crops of wood, economically available now or prospectively, and not withdrawn from timber utilization.

Reserved-Commercial Forest Land.

Commercial forest land managed for purposes other than timber production; the timber is not available for cutting because of statute, proclamation, or policy.

Noncommercial Forest Land.

Forest land which is incapable of yielding usable wood products because of adverse site conditions, or so physically inaccessible as to be permanently unavailable economically, and not withdrawn for specified purpose.

Reserved Noncommercial Forest Land.

Noncommercial forest land included in areas set aside by statute, proclamation, or policy, as recreational or museum areas.

Forest Types

Forest Type.

A forest stand characterized by the predominance of certain key species--in terms of cubic volume for saw-timber and pole-timber stands, and in number of trees for seedling and sapling stands--or a forest condition such as nonstocked cut-over or burned-over land. The generalized forest types listed in table 3 are of the following composition:

Douglas-fir. Stands comprised of 60 percent or more of Douglas-fir by cubic volume or number of trees.

Lodgepole pine. Stands comprised of 50 percent or more of lodgepole pine by cubic volume or number of trees.

Western hemlock. Stands comprised of 50 percent or more of western hemlock by cubic volume or number of trees.

Sitka spruce. Stands comprised of 50 percent or more of Sitka spruce by cubic volume or number of trees.

Western redcedar. Stands comprised of 40 percent or more of western redcedar by cubic volume or number of trees.

White pines. Stands comprised of 20 percent or more of western white pine by cubic volume or number of trees.

True firs-mountain hemlock. Stands in which either Shasta red fir, noble fir, Pacific silver fir, or mountain hemlock or any combination of these species, comprise 50 percent or more of the cubic volume or number of trees.

Hardwoods. Stands comprised of 50 percent or more of one of the merchantable hardwood species. Does not include stands of scrub oak and madrone.

Nonstocked area. Cut-over or burned-over area on which the restocking, if any, is less than 10 percent density and which does not support a residual stand meeting minimum saw-timber requirements.

Tree Classes

Saw-Timber Tree.

Softwood or hardwood tree 11.0 inches d.b.h. or larger containing at least one 16-foot log to a variable top diameter inside bark approximating 40 percent of diameter breast height, but never less than 8 inches, and in which one-third or more of the gross board-foot volume is free from rot and defect.

Pole-Timber Tree.

Softwood or hardwood tree 5.0 to 10.9 inches d.b.h. in which one-third or more of the gross cubic-foot volume is free from rot and defect.

Cull Tree.

Live tree of saw-timber or pole-timber size that is unmerchantable now or prospectively because of defect or rot.

Stand-Size Classes

Saw-Timber Stand.

Stand of saw-timber trees having a minimum net volume per acre as follows: 5,000 board feet, log scale, Scribner rule, in any conifer species except the pines; 2,000 board feet in any of the pines; 1,000 board feet in hardwoods.

Old-growth saw-timber stand. Stand in which the majority of the cubic-foot volume is in trees more than about 180 years of age and larger than 21.0 inches d.b.h.

Large young-growth saw-timber stand. Stand in which the majority of the cubic-foot volume is in trees under about 180 years of age and from 21.0 inches to 40.9 inches d.b.h.

Small young-growth saw-timber stand. Stand in which the majority of the cubic-foot volume is in trees under 180 years of age and from 11.0 to 20.9 inches d.b.h.

Pole-Timber Stand.

Stand failing to meet saw-timber-stand specifications but of at least 10-percent stocking of trees 5.0 inches d.b.h. and larger, with at least one-half the minimum stocking in pole-timber trees (5.0 inches to 10.9 inches d.b.h.).

Seedling and Sapling Stand.

Stand not qualifying as either saw-timber or pole-timber stand but having at least 10-percent stocking of trees and with at least one-half the minimum stocking in seedlings and saplings (0 inch to 4.9 inches d.b.h.).

Timber Volume

Live Saw-Timber Volume.

Includes all saw-timber volume except that in dead trees--measured in board feet.

Scribner rule. The common board-foot rule used in determining log-scale volume of saw timber in this region. This rule underestimates, particularly in case of timber of the smaller diameters, the volume of lumber that could be produced from the timber.

International ¼-inch rule. The standard board-foot rule adopted by the Forest Service in the presentation of Forest Survey volume statistics. Volumes in this rule approximate lumber tally.

Primary Growing Stock.

Net volume in cubic feet of live saw-timber trees and live pole-timber trees from stump to a minimum 4.0-inch top inside bark.

Secondary Growing Stock.

Net volume in cubic feet of all cull trees from stump to a minimum 4.0-inch top inside bark.

Salvable Dead.

A dead standing saw-timber tree in which at least one-third of the gross board-foot volume is free from rot or defect and in which sound volume totals at least 30 board feet.

Saw-Timber Volume.

Net volume in feet board measure of saw-timber trees of all species to a merchantable top. Includes both live and salvable dead saw-timber trees (standing and down).

All-Timber Volume.

Net volume in cubic feet of saw-timber trees, pole-timber trees, and cull trees of all species from stump to a minimum 4.0-inch top inside bark. Includes both live and salvable dead saw-timber volume and pole-timber volume.

Species.

Commercial tree species that grow in Cowlitz County include:

Softwoods:

Douglas-fir (Pseudotsuga taxifolia).
Western white pine (Pinus monticola).
Western hemlock (Tsuga heterophylla).
Mountain hemlock (Tsuga mertensiana).
Western redcedar (Thuja plicata).
Sitka spruce (Picea sitchensis).
Engelmann spruce (Picea engelmanni).
Pacific silver fir (Abies amabilis).
Grand fir (A. grandis).
Noble fir (A. procera).

Hardwoods:

Red alder (Alnus rubra).
Bigleaf maple (Acer macrophyllum).
Black cottonwood (Populus trichocarpa).
Oregon ash (Fraxinus oregona).

Commodity Drain

Commodity Drain on Live Saw Timber.

The live saw-timber volume removed through cutting drain and logging waste during the inventory year.

Cutting drain. The live saw-timber volume entering into timber products during the inventory year.

Logging waste. The live saw-timber volume that is cut or killed during the inventory year by logging but not converted to timber products.

Commodity Drain on Primary Growing Stock.

The primary growing stock removed through cutting drain and logging waste during the inventory year.

Cutting drain. The volume of primary growing stock removed through cutting drain and logging waste during the inventory year.

Logging waste. The volume of primary growing stock that is cut or killed during the inventory year by logging but not converted to timber products.

Accuracy of Data

Sampling Error.

A measure of the reliability of timber volume estimates based on the variability shown by sample measurements of the volume.

Standard Error.

An expression of the probability of timber volume estimates being within a specified range of limits around the actual timber volume.

Comparison of Inventories

Ingrowth.

The volume, or number, of trees that have grown past the specified lower diameter limit of a stand-size class.

Outgrowth.

The volume, or number, of trees that have grown past the specified upper diameter limit of a stand-size class.